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A Summary of the 1977 Annual Water Quality Management Plan for North Central Texas

North Central Texas Council of Governments, Arlington

Prepared for

Environmental Protection Agency, Dallas, Tex Region VI

Jul 77

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16. Abstracts

This summary document presents the major findings and recommendations of the initial "208" water quality management plan for the 3,300 square mile urbanizing portion of the Dallas/Fort Worth, Texas region. The complete three-volume annual plan identifies a 1977 Sewerage Improvements Program; assesses the degree to which the adopted 1990 regional sewerage plan recommendations and the State and National effluent quality goals are being implemented; assesses the economic, social and environmental impacts of the program; and summarizes the public participation activities during 1976-77. While this initial plan focuses on point sources, the 1978 Annual Plan under preparation will address all sources of water pollution, with particular attention to nonpoint sources.

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17b. Identifiers/Open-Ended Terms

North Central Texas, Dallas/Fort Worth Area, Trinity River, Texas
1977 Annual Plan

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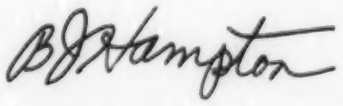
To the Citizens of this Region:

Beginning in early 1976, representatives of many interests, through the NCTCOG, have been participating in a planning program aimed at the development of a preferred Water Quality Management Plan for the Dallas/Fort Worth metropolitan area. Under the requirements of Section 208 of P.L. 92-500 (Federal Water Pollution Control Act Amendments of 1972), an initial plan addressing both point and nonpoint pollutant sources is due by mid-1978. However, because of the importance of the water quality issue and the need for maximum involvement in this planning process, the preparation of a 1977 Annual Water Quality Management Plan was considered desirable. This plan focuses on the management and planning activity of the region's vast network of waste collection and sewage treatment facilities.

Water in sufficient amounts and of good quality is basic to our very existence. The Nation has only recently come to realize that maintenance and improvement of our lakes and streams is a complex issue that no longer can be addressed by placing all our emphasis on pollutant removal from sewage. The 1977 Annual Plan documents this area's commitment and leadership position for wastewater treatment. In addition, it sets the stage for the preparation of the 1978 Annual Plan which also will analyze nonpoint pollutant magnitude, determine impact on water quality, and assess control techniques that may be necessary.

With your assistance, we can preserve the high quality of our lakes and achieve a cleaner Trinity River.



B. J. Hampton
Chairman, Areawide Planning
Advisory Committee, 1976-77

What is NCTCOG?

The North Central Texas Council of Governments is a voluntary association of cities, counties, school and special purpose districts in the North Central Texas region, organized to provide a forum for the discussion of areawide problems and to promote regional problem-solving through cooperative programs and comprehensive regional planning. The Council of Governments is a cooperative effort in which local governments may pool their resources to meet challenges beyond their individual capabilities. By promoting intergovernmental coordination and cooperation and by carrying on regional planning programs, NCTCOG both complements and supplements the work of local governments and community groups which serve the public.

North Central Texas is a 16-county metropolitan region centered around Dallas and Fort Worth. It has a population of 2.9 million and an area of 12,627 square miles. NCTCOG has 170 member governments who support the Council's activities through their contributions. The membership currently includes 16 counties, 121 municipalities, 16 independent school districts, and 17 special purpose districts.

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Planning Process

What is the National Goal?

In 1972, the Congress of the United States passed Public Law 92-500, the Federal Water Pollution Control Act Amendments. The objective of the Act is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

This Act establishes as a "national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish and wildlife and provides for recreation in and on the water be achieved by July 1, 1983."

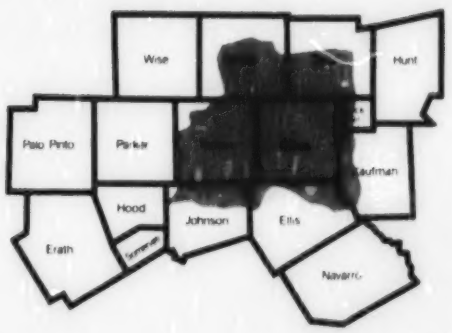
How will this be Accomplished?

Under Section 208, the Act establishes a nationwide planning program for working towards the goals of PL 92-500. Each state and designated planning agencies within urban areas of the state must establish a continuing areawide planning process and determine a preferred water quality management plan which is tailored to the pollution problems that are unique to that area and which addresses the "fishable/swimmable" goal of the Act. The plan must address the magnitude of pollution from all sources, ranging from treatment plants to direct precipitation; determine their effect on water quality; analyze controls that could be instituted to limit pollution from the various sources; weigh the economic, social, and environmental impacts of these controls; and select through an extensive public participation program the preferred water quality management plan for that region. Once a plan is adopted, all treatment plant permits and construction grant requests must be in conformance with the plan.

Who is Responsible in the Dallas/Fort Worth Area?

In mid-1975, the North Central Texas Council of Governments, at the request of the region's local governments, was formally designated by the Governor of Texas and the Administrator of the U.S. Environmental Protection Agency as the "208" water quality management planning agency for the 3,300 square mile urbanizing portion of the Dallas/Fort Worth region.

NCTCOG has organized its planning program into annual planning cycles, with each cycle producing a formal annual plan at its conclusion. This summary document presents the major findings and recommendations of the initial 208 plan for the region, the "1977 Annual Water Quality Management Plan for North Central Texas." It was prepared as the culmination of the 1976-77 annual planning cycle.



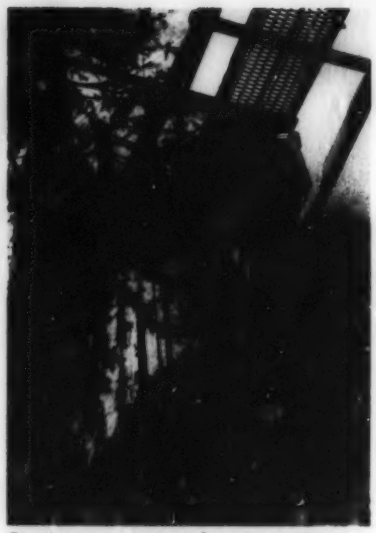
Annual Plan

The 1977 Annual Plan consists of the following three volumes and this summary within a three-ring binder:

Volume One: Waste Treatment Management Program, which identifies a "1977 Sewerage Improvements Program" consisting of major publicly owned sewage treatment plants, significant industrial plants (and finds there are none), major trunk sewers, and active planning areas. The document assesses the degree to which the adopted 1990 regional sewerage plan recommendations (from the 1970 Upper Trinity River Basin Comprehensive Sewerage Plan) and the state and national effluent quality goals are being implemented.

Volume Two: Impact Analysis of the Waste Treatment Management Program, which assesses the economic, social, and environmental impacts of Volume One.

Volume Three: Public Participation/Review Process, which summarizes the public participation activities during 1976-77, and provides space for the incorporation of comments received during the formal review and approval process.



Continuous automated water quality monitor above Trinity River

Recommendations

The 1977 Annual Plan contains a number of general and specific conclusions and recommendations. The three principal general recommendations of the plan are:

- The concept of joint systems of treatment works, each serving a number of cities has been accepted and is being implemented in the area. These systems should be encouraged to expand through local initiative and State permitting programs. Ultimate service area projections for existing plants as well as projected new plants will be determined during 1977-78 in preparing the 1978 Annual Water Quality Management Plan.
- The region has demonstrated a strong commitment to achieving sewage treatment levels more stringent than the national requirement of secondary (30/30). In fact, approximately 90% of the sewage generated in the planning area will be treated to the more stringent 10/10 standards upon the completion of present plant expansion and upgrading, most of which will be on line in 1978. Because of the impacts on the region anticipated by this advanced level of treatment and other factors, it is recommended that the State refrain from imposing more stringent requirements than 10/10 and await recommendations from 208 planning for future pollution control techniques.
- An analysis of present on-going "Step 1" facilities planning in the region under Section 201 of PL 92-500 indicates no apparent conflicts with 208 planning and continued EPA funding of these projects is recommended.

What is the 1977 Sewerage Improvements Program?

The 1977 Sewerage Improvements Program can best be described as the ongoing activities of existing wastewater treatment and conveyance facilities as well as the construction and active planning of extensions to these and new facilities.

The 1977 SIP includes the 24 major publicly owned treatment plants, the major trunk sewer systems, consideration of industrial sources, and the active planning areas. Data is organized by the seven major watersheds, referred to as presentation areas.

The 1977 SIP is presented in detail in "Volume One: Waste Treatment Management Program" of the 1977 Annual Plan.

Major Publicly Owned Plants

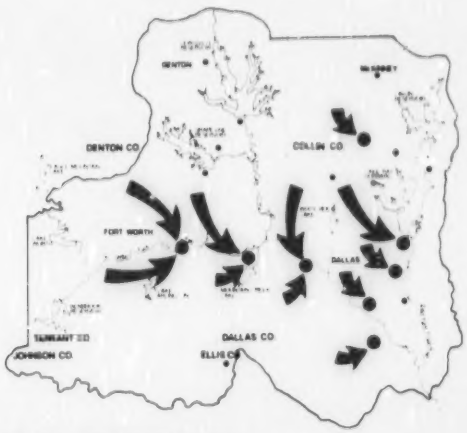
Twenty-four publicly owned wastewater treatment plants have permitted flows of 0.5 million gallons per day or greater.

They account for 97% of the 291 mgd average daily domestic sewage flow in the planning area. Seventy-eight other plants treat the remaining 3%.

Major Trunk Sewers

An updated inventory of all major trunk sewers and service areas in the region was made as part of the 1977 SIP.

The major trunk sewers range in size up to 96 in. in diameter for gravity lines, and have a total length of approximately 400 miles. There are no combined sewer systems in the region.



● Joint Treatment Systems
• Other Major Plants

Industrial Sources

There are no industrial waste treatment pl[illegible] w[illegible]n significant process water discharges directly to waterways.

Process water from major manufacturers is pretreated before being transmitted to municipal plants.

Of the 35 industrial point sources in the region, virtually all the flow is once-through cooling water for electrical power generation plants.

Active Planning Areas

Two types of planning are covered in the definition of active planning areas. The first are those projects within the Federal and State grant process, including so-called "Step 1" facilities planning under Section 201 of PL 92-500.

The second are those areas with projects not yet under construction, which may be constructed with or without federal funds, but for which an administrative commitment has been made.

Visit to NTMWD Plano treatment plant.

Implementation of the "UTRBCSP"

The "UTRBCSP"

The "Upper Trinity River Basin Comprehensive Sewerage Plan" (UTRBCSP) was developed by NCTCOG and its consultants with community input from 1969 to 1971 and approved by NCTCOG and the Governor of Texas in 1971. It recommends an areawide comprehensive sewerage system and program for interceptor (trunk) sewers and sewage treatment facilities in much of the 21-county, 11,000-square-mile area of the Upper Trinity River Basin, and methods for plan implementation. It was amended for the East Fork in 1973. It was the first regional plan in the nation approved by the U.S. EPA.

The Sewerage System Recommendations

The recommended sewerage facilities program of the UTRBCSP as amended in 1973 for the East Fork consists of two components:

1. Joint systems of treatment works, primarily for the urbanized Dallas-Fort Worth metropolitan area; and
2. Independent facilities for outlying communities in the remainder of the 11,000-square-mile Upper Trinity River Basin.

Implementation of the sewerage facilities for the Metropolitan Area was to be by stages: Initial by 1975, Future Stage 1 by 1990, and Future Stage 2 by 2020.

The joint systems recommended for the Metropolitan Area for 1990 include:

- Fort Worth Village Creek joint system, with the Village Creek plant and associated interceptor sewers.
- Trinity River Authority Central joint system.
- Trinity River Authority Ten-Mile Creek joint system.
- Dallas Central (formerly White Rock) and Dallas Southside joint system(s).
- East Fork joint system, consisting of the Plano, Duck Creek, Mesquite and several smaller plants.

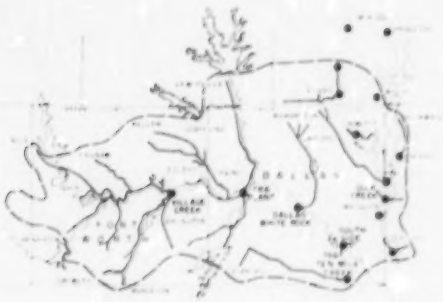
Comparison of 1977 Sewerage Improvements Program to the UTRBCSP Recommendations

Virtually all the recommendations of the amended 1970 Plan for wastewater treatment plants have either been completed, are under construction, or are in the active planning stage.

Further, most of the initial-stage interceptor construction has occurred, and in many cases, Future Stage 1 interceptors were constructed ahead of the recommended schedule to accommodate growth in the area, or are in the construction or planning phases. There are no significant deviations from the UTRBCSP.

Minor changes mainly involve small treatment plants being constructed as interim measures to be abandoned when interceptors from the joint systems are constructed. In several cases, areas recommended for independent wastewater treatment facilities actually became (or will become) part of the joint systems.

UTRBCSP Recommendations



Implementation of State Treatment Levels

Under PL 92-500, the states have the right and responsibility to establish the overall water quality levels desirable for their waterways. However, the states' goals must coincide with the goals of the Federal Act.

Effluent goals as prescribed by PL 92-500 require a minimum of "30/30", or so-called secondary treatment.* The Federal requirements do not limit the states from imposing more stringent requirements as necessitated by the status of the water courses and the states' goals for the uses of its waterways.

Texas state standards for water quality levels and effluent quality criteria, the general results of the State Trinity River Basin Plan, and the computer modeling efforts undertaken as an aid to the setting of waste load allocations for various stretches of the waterways in the designated planning area are discussed in the 1977 Annual Plan.

The State effluent requirements which are recommended in the 1977 Sewerage Improvements Program are summarized in the accompanying figure.

*30 parts per million biochemical oxygen demand and 30 ppm total suspended solids for a 30-day average.

Conclusions on Compliance with State and National Effluent Requirements

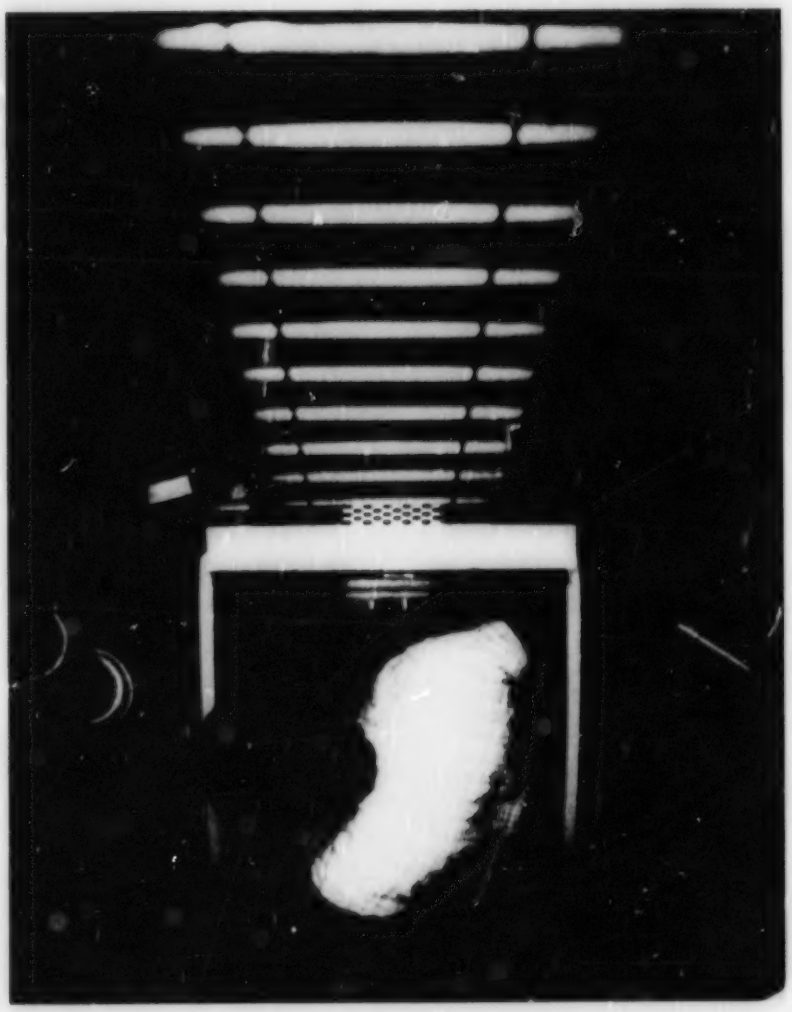
The existing and planned wastewater treatment facilities, as per the abatement schedule under the State Waste Control Orders (WCO) Program, are or will be in compliance with state requirements, and will offer degrees of treatment much more stringent than the minimum "30/30" requirements contained in Federal statutes.

When the 1977 Sewerage Improvements Program is implemented, more than 95% of the sewage generated in the planning area will be treated at 10/10 or 10/15 standards.

This is no surprise since secondary treatment for this area has been practiced and endorsed by the State's agencies involved in water quality and public health for over 40 years. Since the region has been ahead of most of the nation in its recognition of the need for at least secondary treatment of effluents, the region's compliance to the State's policy of more stringent treatment levels can be interpreted as a continuation of past policy and a desire to produce a high quality in its water courses, not only suitable for the beneficial uses as set by the State, but also one which will be beneficial to the area's growth.

Effiuent Requirements for Major Wastewater Treatment Plants under the 1977 Sewerage Improvements Program

		Requirements as of July 1976		Plant Improvements Program		
No.	Plant	Permitted Capacity (Avg Day in mgd)	Permitted Effluent Quality Level *	Permitted Capacity (Avg Day in mgd)	Permitted Effluent Quality Level *	Date Anticipated on Line
A1	Midlothian	0.9	30/30	0.9	30/30	1978
B1	Denton	6.0	20/20	12.0	10/15	1980
B2	Grapevine (Morehead)	1.5	20/20	None required		N/A
C1	Lewisville	1.8	10/10	9.0	10/10	Completed
C2	Flower Mound MUD	0.7	5/5	None required		N/A
D1	Garland (Rowlett Creek)	6.0	10/10	16.0	10/10	1979
D2	NTMWD (Plano)	6.0	10/10	None required		N/A
D3	McKinney (South)	2.0	30/30	4.0	10/15	1980
D4	Wylie	0.8	20/20	0.8	10/15	1980
D5	Rockwall	0.6	20/20	0.6	10/15	1980
E1	Garland (Duck Creek)	10.0	20/20	30.0	10/10	1977
E2	NTMWD (Mesquite)	5.5	20/20	12.8	10/10	1978
E3	Seagoville	1.2	20/20	None required		N/A
F1	TRA (Central)	30.0	20/50	100.0	10/10	1978
F2	Fort Worth (Village Creek)	45.0	20/20	96.0	10/10	1978
F3	Fort Worth (Riverside)	32 3	30/55	To be phased out		1978
F4	Haltom City	1.2	20/20	To be phased out		1979
F5	Fort Worth International Airport	0.5	20/20	To be phased out		Completed
G1	Dallas (Central)	94.0	20/20	150.0	10/10	1977
G2	Dallas (Southside)	7.0	30/30	10.0	10/10	1977
G3	TRA (Ten Mile Creek)	6.8	20/20	None required		N/A
G4	Richardson (Floyd Branch)	2.2	20/20	None required		N/A
G5	Balch Springs (WCID No. 6)	0.6	20/20	To be phased out		1979
G6	Kleberg (WCID No. 7)	0.5	20/20	To be phased out		1980



Findings from the Waste Treatment Management Program

The findings by Camp Dresser & McKee, the consulting firm which prepared Volume One, are:

"From the investigations performed to formulate this report, it can be concluded that the communities and authorities in the designated planning area have exhibited a willingness and determination to construct the facilities necessary to produce wastewater effluents of high quality and thus preserve and/or improve the quality of the area's receiving water.

"The 1977 Sewerage Improvements Program, representing the existing conditions and the ongoing construction and/or planning activities in the NCTCOG designated planning area offers exemplary proof of this contention.

"The 1977 Sewerage Improvements Program illustrates that over the past six years, the overall objectives and specific recommendations of the 1970 UTRBCS plan as amended, have been accepted, and implementation is well on the way to becoming a reality.

"The 1977 Sewerage Improvements Program is also in compliance with the State requirements for effluent quality levels for 1977 and will provide a much higher quality effluent than the minimum Federal requirements for 1977."

Impact Analysis

The second volume of the 1977 Annual Plan, "Volume Two: Impact Analysis of the Waste Treatment Management Program," assesses the historical progression to present conditions, and the expected economic, social, and environmental impacts of implementing the 1977 Sewerage Improvements Program contained in Volume One of the 1977 Annual Plan.

Purpose

The impact analysis document has several purposes. It is an active aid to the entire planning process for the basin. It serves as the vehicle for disseminating environmental and other information to the public and responsible agencies. It is a document that fulfills legal requirements for environmental analysis under the National Environmental Policy Act (NEPA) and Section 208 of PL 92-500.

Scope

Since the impact analysis is the first major step in developing a comprehensive impact assessment process, it focuses on the primary impacts of point source control measures. Consideration of nonpoint source control measures and of both primary and secondary impacts of each will be included in the 1978 Annual Plan.

Impacts have been grouped in Volume Two into four categories as follows:

- Natural/Environmental Resources, including the region's land surface/subsurface, water, and air resources.
- Human Activities, including population, economy, land use, housing, recreation, aesthetics, cultural and regional life style.
- Costs, including the capital costs and funds spent annually for operation and maintenance of the waste treatment systems.
- Management and Financial Programs, including the institutional and financial approaches to waste treatment management.

Time Frame

The impact analysis considers four time periods: before 1970, 1970, 1976 and future impacts. These periods were chosen to represent conditions prior to and during development of the Upper Trinity River Basin Comprehensive Sewerage Plan, changes while the UTRBCSP has been implemented, and the anticipated future impacts as a result of the 1977 Sewerage Improvements Program.

The assessment of future impacts will be expanded and refined during the 1977-78 planning cycle for incorporation into the 1978 Annual Plan.

Natural/Environmental Resources

Natural/environmental resources include land surface/subsurface, water and air resources. Highlights from findings in each of these categories follows.

Land Surface/Subsurface Resources

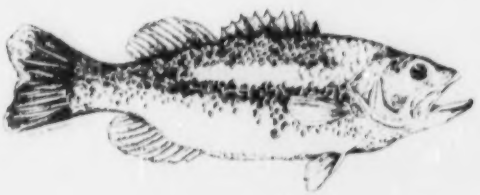
The impact analysis presents current conditions regarding topography, geology, and terrestial biology. Vegetation in the area is generally hardy, but has been considerably altered by agriculture and urban development. The only rare plant is, in fact, so rare that nothing is known about it.

Wildlife species classed as threatened and endangered (e.g., the black bear and the bald eagle) have probably never lived in the area in great number.

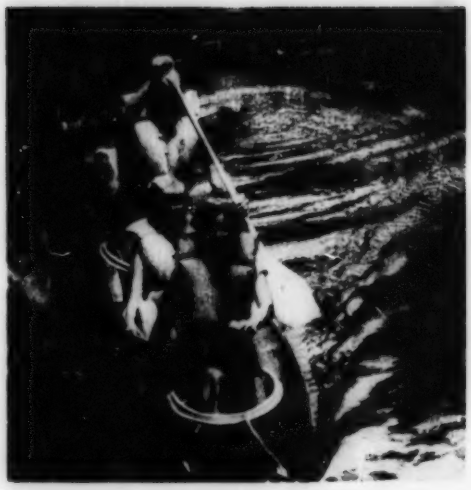
Air Resources

The two pollutants which currently pose a problem in the planning area are ozone and particulates. Direct air quality impacts of the 1977 Sewerage Improvements Program are generally relatively minor and are a result of emissions from treatment plants, and construction of sewer lines. Most sludge is land filled and disposal is not currently a problem in the region.

The most significant air quality impacts are indirect and result from development induced in the waste treatment service areas. These indirect impacts are being assessed during the 1977-78 planning cycle for inclusion in the 1978 Annual Plan.



Water Resources



There are nine major lakes among the area's surface water resources, and the Trinity River which includes the main stem plus four forks.

Lake water quality is generally good, and the reservoirs presently meet water quality criteria that can be judged "fishable and swimmable." Although point source loadings to these lakes would increase by 1983, it is not anticipated that effluent loads would be large enough to change their present conditions.

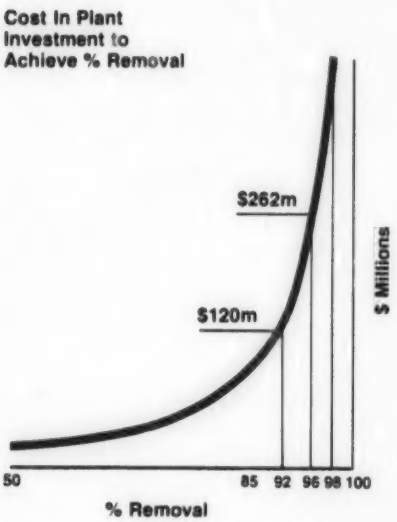
By implementing the 1977 Sewerage Improvements Program, the polluted water quality of the Trinity River main stem, West and East Forks is expected to improve by 1980. At that time, all treatment plant expansion or upgrading is expected to be complete. The projected 1980 loads of BOD and total suspended solids would be below the 1968 levels (prior to implementing the UTRBCSP) and approximately a quarter of the 1975 loadings (before implementing the 1977 Sewerage Improvements Program).

The magnitude of the anticipated improvement in Trinity River water quality has been the subject of much debate between the local governments and the State. The local governments have recommended that any additional treatment requirements beyond 10/10 permit levels await the completion of the 1978 Annual Plan and evaluation of the in-stream results achieved after the major 10/10 plants are completed and operating.

Costs

More than $150 million is being spent to expand and upgrade the major wastewater treatment plants as described in the 1977 Sewerage Improvements Program. Many of these costs have not yet been added to the consumer's monthly sewer bill.

Incremental costs increase substantially to go from 92% pollutant removal (20/20 permits) to 96% pollutant removal (10/10 or 10/15 permits).



Management & Financing

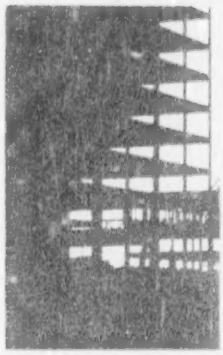
Eight regional organizational alternatives for managing and financing, ranging from a private corporation to a regional multi-purpose government were assessed as part of the UTRBCSP. The institutional arrangement which was recommended and which has been implemented is the "Coordinated Joint System" approach. This encompasses the major joint systems with the following system operators: the Trinity River Authority with two systems; the North Texas Municipal Water District and Garland in the East Fork; the City of Fort Worth and the City of Dallas.

A Water Quality Council was formed within NCTCOG to coordinate planning. This role is now performed by the Areawide Planning Advisory Committee. Management agencies will be formally designated as part of the 1978 Annual Plan.

Human Activities

Generally, the economic climate of the region in the recent past and foreseeable future is both strong and resilient. The current population within the SMSA is almost 2.8 million and is projected to increase to slightly over 4 million by the year 2000. The distribution of future regional population based on infrastructure investment is being examined closely as part of the 1977-78 planning cycle.

The life style and attitudes of the citizenry must be understood, and, through a rational process, planners must be able to predict environmental changes which will occur if these attitudes do or do not change.



Public Participation

To be worthwhile, a plan of any type must lead to implementation. This means that the public — government officials, interested organizations and individuals, or the general public — must be involved to the fullest extent practicable in the development and adoption of the plan.

The Federal Water Pollution Control Act Amendments of 1972 provide direction on how state, local, and regional entities can encourage and assist public participation in water quality matters. Each agency carrying out activities under the Act shall provide for and conduct a continuing program for public participation comprised of the following mechanisms at a minimum: informational materials, assistance to the public, consultation, notification, access to information, and other measures as appropriate.

The federal regulations require that a "Summary of Public Participation" be prepared annually as part of the plan. The annual summary must describe measures taken by the North Central Texas Council of Governments (and participating local governments) to provide for, encourage, and assist public participation; the public response to such measures; and the disposition of significant points raised.

"Volume Three: Public Participation/Review Process" of the 1977 Annual Plan contains the required Summary of Public Participation.

The volume begins with a description of the federal requirements, the 1976-77 Public Participation Program adopted by NCTCOG in mid-1976, the goals of public participation, and the public/NCTCOG committee actions. Then, for each mechanism employed by NCTCOG to encourage public participation, the chapter identifies the continuing program for that mechanism and the specific activities conducted during the 1976-77 planning cycle.

Highlights of the public participation program during 1976-77 include:

- Presentation of the slide show "What Is Our Water Worth?" to many groups.
- A series of major regional workshops.
- Attitudinal surveys of the general public.
- Extensive public review of working papers.
- Quarterly newsletter and periodic brochures.

Participants in clean water workshop at NCTCOG Annual General Assembly meeting.

TRINITY

WE CAN DO IT

Committees

In order to provide guidance for the areawide water quality management planning program, the North Central Texas Council of Governments has involved the following committees.

NCTCOG Executive Board

The Executive Board is the governing body of the North Central Texas Council of Governments. It determines policy, appraises work programs and controls expenditures. It is comprised of nine elected officials and two regional citizen representatives. The Executive Board receives recommendations on water quality management planning products from APAC and must endorse implementation plans before final submittal to the State and the U.S. Environmental Protection Agency for certification and approval.

Areawide Planning Advisory Committee and Subcommittees

An Areawide Planning Advisory Committee was appointed by the Governor of Texas in December, 1975, to furnish general policy guidance to the water quality management planning process under the direction of the NCTCOG Executive Board. The APAC has established a Steering Subcommittee to furnish regular guidance to the process and a Technical Subcommittee to provide technical expertise and review. Operating procedures for APAC and its subcommittees were adopted by APAC in June 1976 and are available from NCTCOG.

The annual plan undergoes extensive review by appropriate subcommittees of the Areawide Planning Advisory Committee (APAC) and authorization by the APAC before submission to the NCTCOG Executive Board.

Annual Review Process

Components of the Annual Public Participation/ Review Process

1. Public Participation During Plan Development

   (Including Committee Activities)

Distribution of draft Plan including "Summary of Public Participation"

2. Local Review

Approval by NCTCOG Executive Board

3. State Review

Certification by the Governor

4. Federal Review

Approval by EPA Regional Administrator

Section 208 of the Act requires that each annual water quality management plan undergo an extensive review and approval process including several levels of government and a public hearing, concluding with approval by the Regional Administrator of the U.S. Environmental Protection Agency.

The four components of the annual public participation/review process are depicted in a simplified manner in the accompanying figure.

As the draft plan progresses through the formal review process, appropriate chapters in "Volume Three: Public Participation/Review Process" are completed and inserted into the loose-leaf binder as the comments, suggestions, and required approvals are received. Thus, when the plan is formally submitted to the EPA Region VI Administrator for approval, it contains a reviewable record of the annual public participation/ review process.

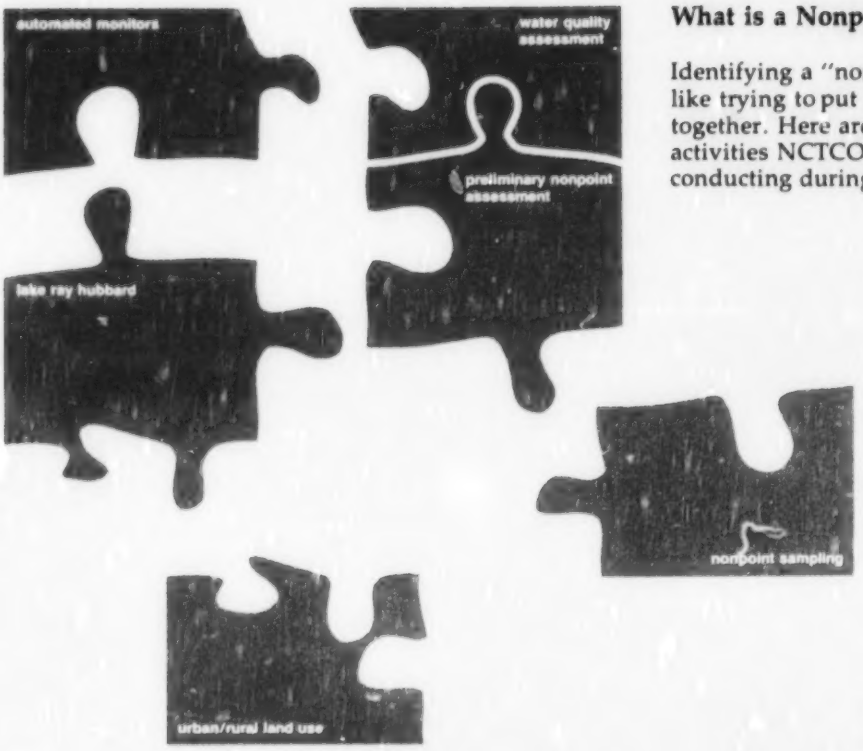
Ongoing Planning during 1977-78

Even as the 1977 Annual Plan is undergoing the formal review and certification process, activities are underway as part of the 1977-78 planning cycle leading to preparation of a 1978 Annual Plan by mid-1978.

Alternative future sewerage facility networks will be identified and evaluated using planning tools such as an Urban Growth Simulation Model. This activity will be another step forward in the development by local governments, through NCTCOG, of a Preferred Regional Development Policy.

The majority of NCTCOG staff and consultant effort during this 1977-78 planning cycle is aimed at determining the magnitude of pollutants from nonpoint sources and analyzing their effect on water quality. An in-field sampling program is being conducted to actually measure nonpoint source pollution from specific types of urban and nonurban lands.

During this cycle, alternative structural and nonstructural management/regulatory control techniques for abating or preventing water pollution will be identified. These techniques will be combined by NCTCOG's advisory committees into alternative water quality management strategies for the area; economic, social and environmental impacts will be assessed; and a preferred water quality management strategy will be recommended in the 1978 Annual Plan.



What is a Nonpoint?

Identifying a "nonpoint" is like trying to put a puzzle together. Here are the activities NCTCOG is conducting during 1977.

Areawide Planning Advisory Committee

Robert M. Alpert
Roy Appleton, Jr.*
William F. Bowles
Alex Bul
Diana Clark*
J. Harold Clary
William Cothrum
George Cullum, Jr.
Harvey Davis
Fratis Duff
Jim Eaton
Tom J. Ewbank*
Clayton T. Garrison
Henry Graeser
George Grimmer
B. J. Hampton*
W. Ralph Hardy*
Clyde Hargrove
Ray Hunt
John G. Keller
Harvey J. Kinkade
John Kubala*
Joel Larkin
Willard Lewis
Willie Mae McCormick
W. Scott McDonald
R. Dan Matkin
Richard C. Newkirk
Raymond D. Noah*
Don Raines
I. M. Rice*
Carl W. Riehn*
J. L. Robinson*
Trent Root, Jr.
Al Ruschhaupt
Jerrel Sartor
George R. Schrader
J. R. Stone
James Strawn*
John F. Wall
Jim White*
Norman F. Whitsitt

*Member of Steering Subcommittee

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Staff of the NCTCOG Department of Water Resources

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Staff Engineer

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Senior Planner

Charles Bayer
Staff Biologist

Carol Frisby
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Nancy Watson
Senior Secretary

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